Operating Instructions

Brinkmann Immersions pumps of the series STE/STL143 ... 146

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1 General

These operating instructions apply to the pumps of the series STE/STL143 ... 146 with different depths of immersion and specifications. The immersion pumps are suitable for handling contaminated coolants, (and extremely inflated fluids / STL construction).
These operating instructions contain basic information and instructions which must be observed when the pump is being installed, operated or repaired. Therefore it is important that these operating instructions are read by the fitter, the operator and relevant technical personnel before installation and start-up, and they are available at all times at the place where the unit/system is being operated.

Specifications

Type	Type	Max. del. pressure bar / spec. weight 1	Max. del. volume l/min	Depth of immersion / **STE** **h** mm	Weight **STE** kg	**STL**	Power kW
STE143 / 190	STL143 / 220	3,9	185	185	25	27	1,5
270	300			265	26	28	
340	370			335	27	29	
420	450			415	28	30	
510	540			505	29	31	
620	650			615	30	32	
STE144 / 220	STL144 / 250	5,3	190	220	26	28	1,7
300	330			300	27	29	
370	400			370	28	30	
450	480			450	29	31	
540	570			540	30	32	
650	680			650	31	33	
STE145 / 270	STL145 / 300	6,6	195	270	30	32	2,2
350	380			350	31	33	
420	450			420	32	34	
500	530			500	33	35	
590	620			590	34	36	
700	730			700	35	37	
STE146 / 300	STL146 / 330	8,1	200	305	31	33	2,6
380	410			385	32	34	
450	480			455	33	35	
530	560			535	34	36	

Depth of immersion STL = h + 30 mm

Mediums	Water, coolant, cooling- and cutting-oils
Kinetic viscosity of the medium	1 .... 90 mm^2/s
Temperature of medium	0 .... 60 °C (80 °C / STL) ....150 °C as special make / STE
Noise level / 50 Hz	STE143...STE146 68 dBA

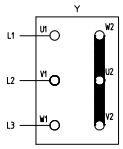
Measuring of noise level according to DIN 45635 at a distance of 1 m.

2 Safety
See appendix A.

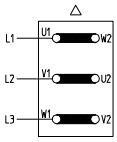
3 Transport and storage
Protect the pump against damage during transportation.
Store pump in dry and protected areas and protect it against penetration of foreign bodies.

4 Description of the product and accessories
Pumps of the series STE/STL143...146 are multi-stage rotary pumps. The impellers are fixed on the driving shaft extension. Pump and motor form a compact and space-saving unit. Pumps of this type are designed with semi-open impellers, (and a suction screw / STL construction).
The motor is surface cooled and complies with the DIN IEC 34 resp. EN 60034 (IP 55).
Tension voltage and frequency must correspond with the shown specification on the nameplate. The terminal links of the motor are delivered in star connection from the plant. A circuit breaker or overload trip must be provided and the tripping current must be adjusted to correspond with the motor rated current.
Special electrical or mechanical versions are described in appendix B (separate sheet)!

Check the terminal links according to the following wiring diagram.



Star connection
3 x 400 V, 50 Hz
resp. 380-420 V, 50 Hz

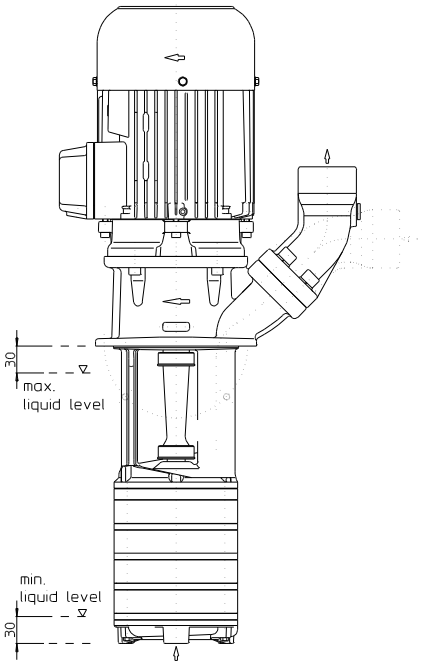


Delta connection
3 x 230 V, 50 Hz
resp. 220-240 V, 50 Hz

Work on the electrical equipment must only be carried out by a qualified electrician.

The motor must be isolated before any work is carried out.

5 Installation
The pumps are mounted on the top of the coolant tank with the pump body being immersed in the coolant. Pumps must be mounted securely. The pipework must be installed so that no distortion of the pump can occur.
According to the drawing shown on the right, the maximum liquid level must stay about 30 mm below the mounting flange. Also ensure that the minimal liquid level for the STE pump is 30 mm before starting up the motor. For the STL pump the suction hole of the pump body must be covered with liquid.
The inlet is at the bottom of the immersed pump body. The distance between the inlet and the tank bottom must be so large that the inlet can not be blocked by deposits during longer shutdowns.
To obtain the full flow rate it is recommended to choose for the pipework the nominal bore diameter of the pump's cross section for connection. Therfore pipe bends should be used, not pipe angles!
The pipework must be qualified for occuring hydraulic pressure!



The pump must be mounted in such a way that rotating parts under the cover of the coolant tank can not be touched!

6 Start up / Shut down
Start up
Switch off at the main fuse.
After connection of the terminals close the terminal box.
Briefly start the motor and check the rotation according to the arrow on the top of the motor. **Looking through the fan cover of the motor, the fan has to turn clockwise.**
If the direction is incorrect change over two of the power leads.

Shut down
Switch off at the main fuse.
Open terminal box and disconnect the power leads
Empty out the pump.

The temperature of the medium is not allowed to be higher than 60 °C for STE and 80 °C for STL or 150 °C as special make for STE!
The pumps are not suitable for continuous running against a closed sliding valve (plan bypass).
The particle-size in the medium is not allowed to be bigger than 2.5 mm!

ATTENTION **<u>Switching-on frequency</u>: Motors less 3 kW max. 200 times per hour.**

7 Servicing and Maintenance

The surface of the motor must be kept free of dirt.
The motor shaft is spinning in permanently greased ball bearings (with special grease and increased bearing play) and does not require any special maintenance. Spare parts are readily available from stock.

8 Trouble shooter's guide

Fault	Cause	Remedy
Motor does not start, no motor noise	At least two of the power supply leads have failed	Check fuses, terminals and supply leads
Motor does not start, humming noise	One of the supply leads has failed Impeller faulty Motor bearing faulty	See above Replace impeller Replace bearing
Pump does not pump	liquid level too low Pump mechanism faulty Pipe blocked	Fill up liquid Replace pump mechanism Clean pipe
Insufficient flow and pressure	Wrong direction of rotation of impeller Pump mechanism silted up Worn pump mechanism	Switch two power supply leads Clean pump mechanism Replace pump mechanism
Power consumption is too high	Wrong direction of rotation of impeller Lime or other deposits Mechanical friction	See above See above Repair pump

Spare parts are available from the supplier.
Standard commercially available parts are to be purchased in accordance with the model type.
The ordering of spare parts should contain the following details:

1. **Pumptype**
   e.g. STE145 / 370
2. **Pump No.**
   e.g. 01042510
   The date of the construction year is a component of the pump's type number.
3. **Voltage, Frequency and Power**
   Take item 1, 2 and 3 from the nameplate
4. **Spare part with item No.**
   e.g. Inlet cover item No. 52

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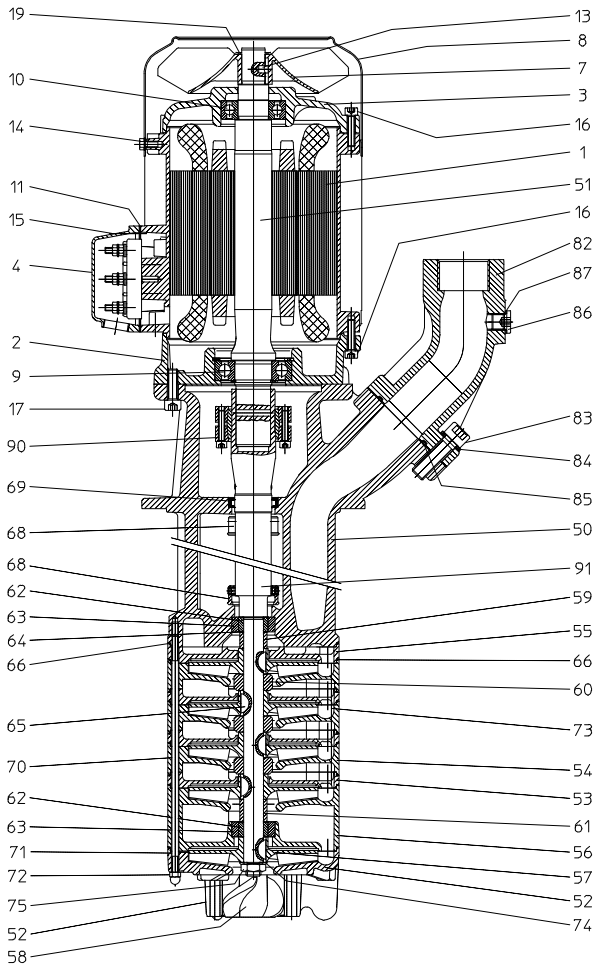
Subject to change without prior notice.
Order - No.: BE2510 ENGLISH

9 Spare part list for the immersion pumps of the series STE/STL143 ... 146

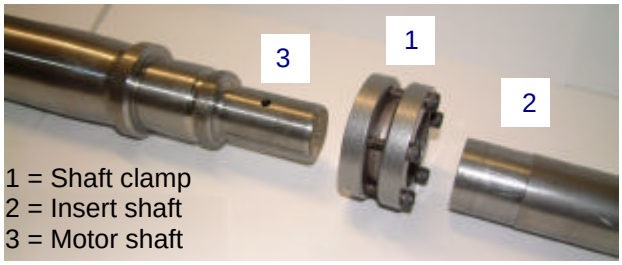


Item	Description	
1	Stator with terminal board	
2	Motor flange	
3	End shield	
4	Terminal box	
7	Fan	
8	Fan cover	
9	Ball bearing	DIN 625
10	Ball bearing	DIN 625
11	Gasket	
13	Parallel pin	DIN 7
14	Thread rolling screw	DIN 7500
15	Slotted cheese head screw	DIN 84
16	Socket head cap screw	DIN 912
17	Socket head cap screw	DIN 912
19	Retaining ring	
50	Pump body	
51	Motor shaft with rotor	
52	Inlet cover for STE	
52	Intake cover for STL	
53	Pump plate for STL	
53	Pump plate for STE	
54	Flow plate for STE	
55	Intermediate Cover	
56	Bearing stage STE/STL145...146	
57	Impeller	
58	Suction screw only for STL	
59	Distance liner	
60	Distance liner	
61	Distance liner	
62	Running sleeve	
63	Bearing bush	
64	Distance plate	
65	Woodruff key	DIN 6888
66	O-ring	
68	Splash ring	
69	Shaft seal	
70	Hexagon head screw STE/ STL143	DIN 931
71	Stud bolt STE/STL144...146	
72	Hexagon domed cap nut STE/STL144...146	DIN 1587
73	Distance bolt STE/STL144...146	
74	Washer only for STE	
75	Hexagon thin nut only for STE	DIN 439
82	Joining socket	
83	Socket head cap screw	DIN 912
84	Spring washer	DIN 7980
85	O-ring	
86	Screw plug	DIN 908
87	Sealing ring	DIN 7603
90	Shaft clamp	
91	Insert shaft	

Tightening torques for screwed connections

Thread - ∅	**M4**	**M5**		**M6**	**M8**	**M12**
Strength classes	4.8	4.8	8.8	8.8	8.8	
Tightening torque in Nm	**1** Nm	**2** Nm Item 15 **3** Nm Item 14 and 16	**4.5** Nm Item 70, 72	**4.5** Nm	**20** Nm Item 17	**30** Nm Item 83 **30** Nm Item 75

10 Repair Instructions / Replacing shaft clamp and shaft



Dismantling the insert shaft

- Disconnect the immersion pump from the mains both electrically and mechanically.
- Set the pump down on the fan cover. Dismantle the pump unit and the pump body.
- Loosen the screws on the shaft clamp (1) one after the other.

  Note: Do not, under any circumstances, remove the screws completely, **danger of injury!**
- Pull the insert shaft (2) and the shaft clamp (1) off the motor shaft (3).

Mounting the insert shaft

- Set the motor down on the fan cover.
- Position the shaft clamp (1) (use a new shaft clamp) in the centre of the cranked clamping diameter (2) of the insert shaft.
- Insert the motor shaft (3) into the insert shaft (2).

Tighten:

- Mark the first screw and tighten all the screws evenly by hand, one after the other in a clockwise direction (not cross-ways).

- Use a torque screwdriver to tighten each screw first with 2 Nm then with 3.5 Nm and finally with 5 Nm (in a clockwise direction again).
- Mount the pump body.

Further assembly is carried out as before.

Note: Note torques for the screw connections!

When putting the pump back into use, **make sure the direction of rotation is correct!**